

During the latter part of summer, tropical cyclone activity in the northwestern Pacific reaches its peak. Multiple circulations develop within the Near Equatorial Trough and two (or more) cyclones of tropical storm or typhoon strength often exist at the same time.

If one tropical cyclone is located to the northwest of another developing circulation, it usually dominates and prevents the system to the southeast from intensifying as rapidly as it normally would. This is due primarily to the upper-level outflow from the system to the northwest which enhances the climatological northwesterlies and restricts the outflow channels of the cyclone located to the southeast. The cyclone to the northwest is also, generally, the older of the two and has the opportunity to establish control of the low-level inflow. The development of the system to the southeast is, therefore, delayed until the other cyclone either weakens or moves far enough away from the tropics that its influence becomes insignificant (see Roger and Tip, 1979 and Lex and Marge, 1980). Typhoon Vernon

and Tropical Storm Thelma engaged in just such an interaction during the end of September and beginning of October.

Vernon was first observed, as an area of increased thunderstorm activity, about 200 nm (370 km) northeast of Eniwetok Atoll on 26 September. Initial movement was westward at about 7 kt (13 km/hr). As the convection continued to organize, a Tropical Cyclone Formation Alert (TCFA) was issued at 270600Z, and the first warning followed 12 hours later.

During that period, Tropical Storm Thelma was developing north of Guam. Thelma, although never more than tropical storm strength, nonetheless had a huge associated cyclonic circulation pattern which extended to at least the 500 mb level and covered most of the area between the Philippine Islands and Guam, and as far north as southern Japan. Because Thelma covered such a large area and was located to the northwest of Vernon, she robbed him of strong low-level inflow and restricted the upper-level outflow in his northwest semicircle in the manner described above.

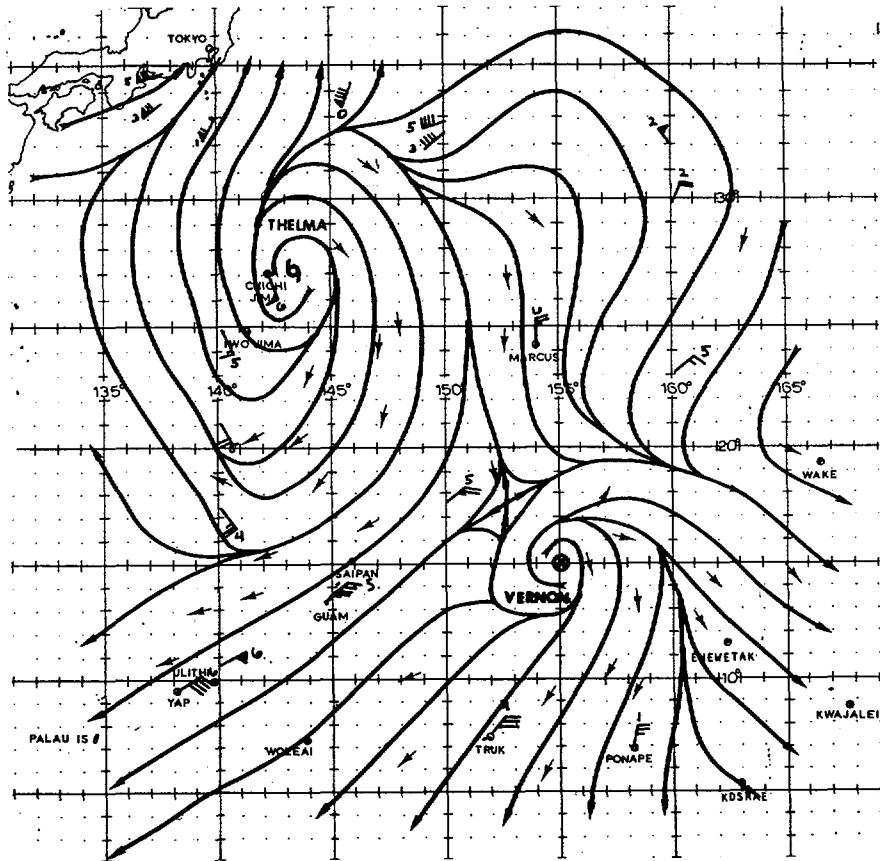


FIGURE 3-22-1. Upper-level streamline analysis (near the 200 mb level) at 290000Z September 1980. Data are rawinsonde and aircraft winds (—) and satellite-derived wind vectors (→). Winds are in knots.

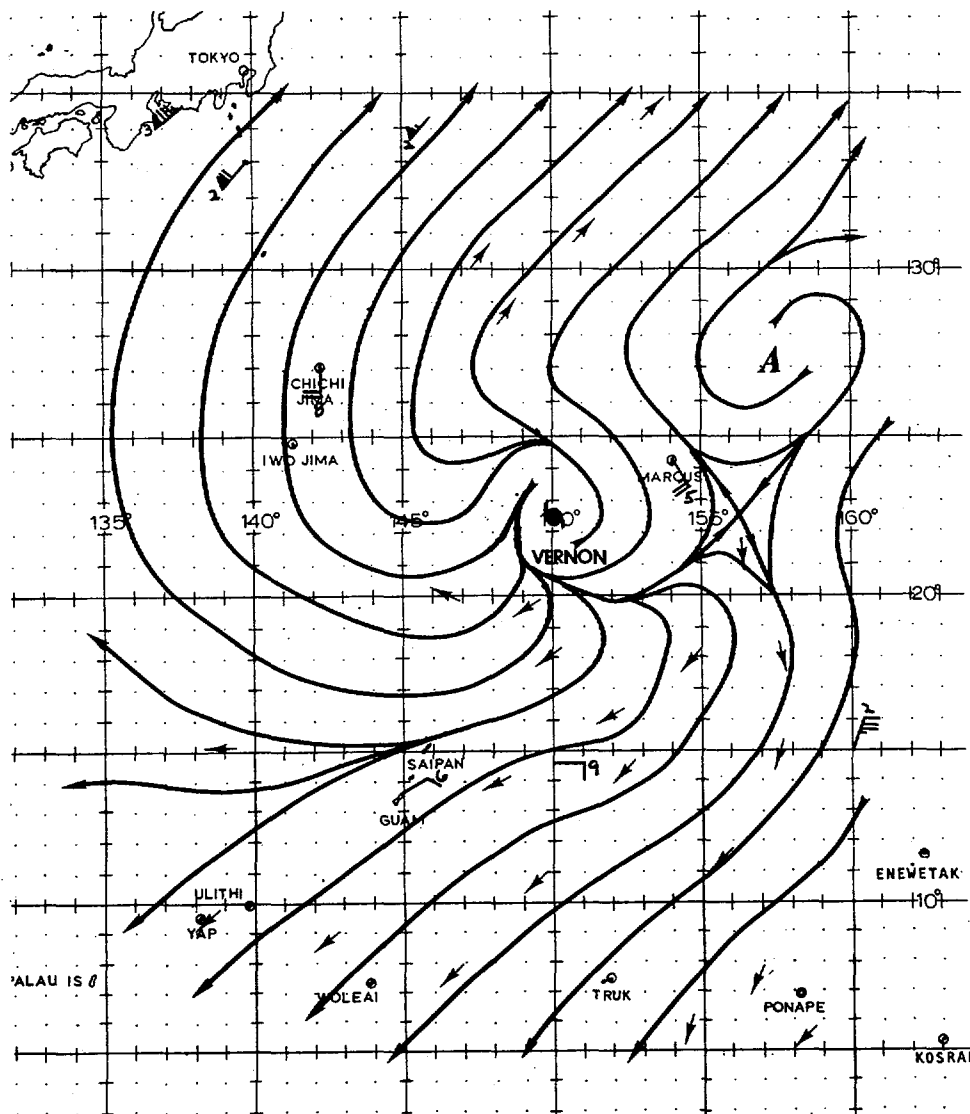


FIGURE 3-22-2. Upper-level streamline analysis (near the 200 mb level) at 011200Z October 1980. Data are rawinsonde and aircraft winds (→) and satellite-derived wind vectors (→). Winds are in knots.

After the 28th, Vernon began tracking more northwestward as he moved into the mid-level trough which was associated with Thelma. Thelma helped to maintain this trough throughout her lifetime as indicated by reconnaissance aircraft and the few island reporting stations in the vicinity. Vernon was steered by the southeasterly winds on the east side of this trough until 021200Z October. At that time, he came in contact with the southern extension of the mid-latitude jet-stream which accelerated him to the northeast, eventually to 53 kt (98 km/hr).

Figures 3-22-1 and 3-22-2 show a dramatic change which took place in the upper-level flow pattern; the outflow from Thelma initially restricted Vernon's out-

flow in his northwest semicircle (Fig. 3-22-1), but by 011200Z, Thelma had moved off to the northeast. This opened up an outflow channel to the north and northwest (Fig. 3-22-2) which enabled Vernon to reach his maximum intensity of 105 kt (54 m/sec) (Fig. 3-22-3). Without the influence of TS Thelma, Vernon most probably would have reached maximum intensity earlier and maintained it longer.

Vernon made the transition to an extra-tropical system quite rapidly. Satellite imagery showed that he lost almost all of his heavy convection between 031200Z and 031800Z. Ship reports off the coast of Japan indicated that the remnants of Vernon continued to maintain gale force winds until 5 October.

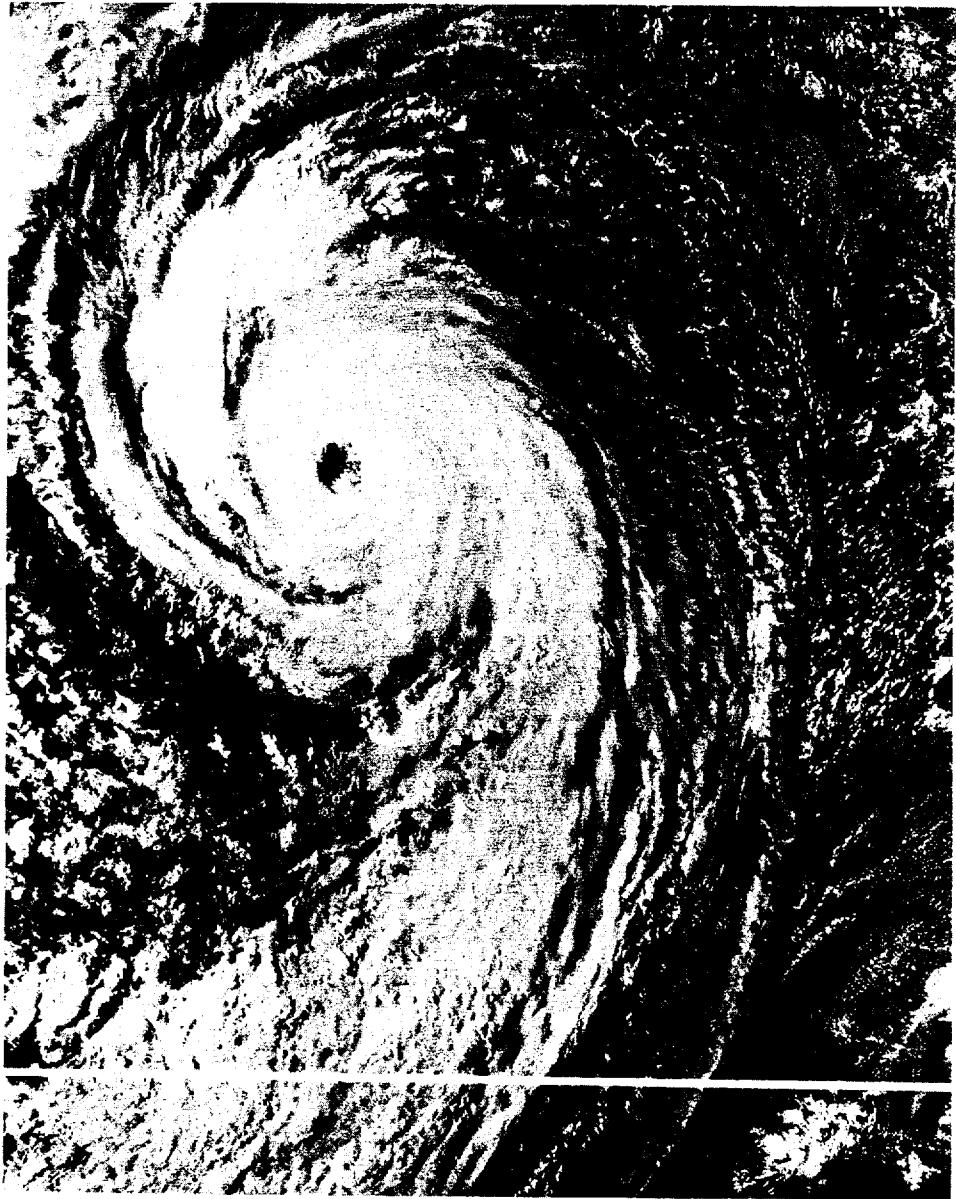


FIGURE 3-22-3. Typhoon Vernon, with a 40 nm (74 km) ragged eye, at maximum intensity of 105 kt (54 m/sec), 01 October 1980, 2216Z. (NOAA6 imagery)